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Doc Code: AP.PRE.REQ

PTO/SB/33 (07-05)
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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional): 2005-1993A

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Application Number	Filed
10/560,808	March 20, 2006

First Named Inventor: Sumio IIJIMA

Art Unit	Examiner
1794	Daniel H. Miller

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEES FOR THIS PAPER TO DEPOSIT ACCOUNT NO 23-0975

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

- ☐ applicant/inventor.
- ☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)
- ☒ attorney or agent of record. Registration number 25,154
- ☐ attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

Signature

Matthew M. Jacob

Typed or printed name

202-721-8200

Telephone number

March 16, 2009

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	**Confirmation No. 9003**
Sumio IIJIMA et al.	:	Attorney Docket No. 2005_1993A
Serial No. 10/560,808	:	Group Art Unit 1794
Filed March 20, 2006	:	Examiner Daniel H. Miller
SINGLE WALLED CARBON NANOHORN ADSORPTIVE MATERIAL AND METHOD FOR PRODUCING THE SAME	:	**Mail Stop: AF**

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEES FOR THIS PAPER TO DEPOSIT ACCOUNT NO 23-0975

Sir:

This Request is submitted in response to the Final Rejection dated September 15, 2008 and the Advisory Action dated January 6, 2009.

This Request is filed with PTO/SB/33 i.e., Pre-Appeal Brief Request for Review and PTO/SB/31, Notice of Appeal.

The remarks begin on page 2 of this paper.

REMARKS

The claims are 6 to 11 with claims 10 and 11 being withdrawn from consideration. Accordingly, the claims under rejection are 6 to 9.

The recited claims are directed to a single walled carbon nanohorn (SWNH) material having a lanthanide metal deposited thereon.

Main claim 6 is directed to the above-described material and claim 7 is directed to such material with a specified amount of lanthanide deposited on the SWNH. Claims 8 and 9 recite specific lanthanides deposited on the SWNH.

Claims 6 to 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kawamura et al. (U.S. 6,706,431).

This rejection is respectfully traversed.

On page 3 of the Final Rejection, the Examiner states:

> Applicant has not addressed why it would not be obvious to provide nanohorns with a lanthanide attached similar to the fullerene with lanthanide, as disclosed by Applicant or why the lanthanide fullerene taught by the reference in contact with aggregates of nanohorns of Kawamura would not meet the claim limitations (emphasis added).

In reply to the first point, as will be discussed below, different carbon allotropes often have different catalytic properties and there is no reason to expect that these allotropes would have similar catalytic properties.

In reply to the second point, where is there any teaching in Kawamura et al. of lanthanide fullerenes in contact with aggregates of carbon nanohorns?

On page 4 of the Final Rejection, the Examiner states:

> It would be obvious to provide a single walled nanohorn with Lanthanum in order to maximize catalytic effect of carbon material. The addition of Lanthanum to fullerenes and other family (members?) of carbon allows the composite to function as a hydrogen storage electrode (column 4, lines 50 to 60). Further, the lanthanide fullerene material has the advantage of being capable of functioning in extreme acidic conditions (column 4, lines 55 to 60).

In reply, the Examiner has provided no evidence that "all members" of the "family of carbon" function in the same way or have similar catalytic effects for Kawamura et al.'s purpose as a hydrogen storage electrode no less for appellant's purpose as a methane storage material.

The present claims are directed to a single walled carbon nanohorn on which a lanthanide has been deposited. This material provides exceptional and unexpected methane adsorptivity.

Applicants have found that the methane adsorptivity of such single walled carbon nanohorns (SWNH) increases remarkably by depositing a lanthanide metal thereon. See Figure 2 of the present specification in this regard.

Kawamura et al. in column 4, lines 15 to 20, relied on by the rejection, merely relates to carbon nanotubes or metal encapsulated fullerenes, as alternatives, to generate active hydrogen in a fuel cell system and not metal encapsulated carbon nanohorns.

Assuming but not conceding that Kawamura et al. presents a *prima facie* case of obviousness, such is rebutted by the above-discussed unexpected methane adsorption capabilities of the presently claimed materials.

The catalytic art is very unpredictable as will be demonstrated below and it is not apparent from Kawamura et al. whether lanthanide encapsulated, single walled carbon nanohorns, if produced, would function in the same way as carbon nanotubes or lanthanide encapsulated carbon nanotubes (the latter not even disclosed by Kawamura et al.).

It is well known to the person skilled in the art that electronic properties of different carbon allotropes are often drastically different. More specifically, it is well known that the electronic properties of fullerenes are essentially different from those of carbon nanohorns.

At the same time, the catalytic properties depend on the electronic properties i.e. the catalytic effects result from the changes in their electronic properties caused by lanthanide.

As long as the electronic properties are different among different carbon allotropes, the changes in the electronic properties caused by lanthanide, which express the catalytic effects, are also essentially different. In other words, they are unpredictable.

Thus, the person skilled in the art would not expect that different carbon allotropes have similar catalytic properties.

As objective evidence of such unpredictability, note, for example, that where a lanthanide metal (Eu) is disposed on activated carbon fiber (A10) as opposed to carbon nanohorns, (see Fig. 2 of the present specification), the density of adsorbed methane is not increased. See page 8, lines 7 to 9 of the present specification in this regard.

While it is denied that Kawamura et al. constitutes a *prima facie* case of obviousness in view of the unpredictability of catalytic activity as supported by the above experimental data, even if it did present a *prima facie* case of obviousness, it would be rebutted by the unexpectedly high methane adsorption properties of the presently claimed materials.

Claim 7 is further unobvious since it recites amounts of lanthanide particularly effective for methane adsorption, (see page 5, lines 4 to 9 of the specification). This feature is not at all taught by Kawamura et al. who is concerned with hydrogen adsorption.

In this regard, it is well known that the methane adsorptivity of SWNH is much larger than its hydrogen adsorptivity. This fact implies that methane adsorption of SWNH is an essentially different phenomenon from hydrogen adsorption of SWNH. Thus, a person skilled in the art would have no reason to expect methane adsorptivity of lanthanide-deposited SWNH, even with the knowledge of hydrogen adsorptivity of lanthanide-deposited SWNH.

Again, please note that Kawamura et al. does not even teach lanthanide deposited SWNH but only SWNH and lanthanide deposited fullerenes.

For the foregoing reasons, it is apparent that the rejection on Kawamura et al. is untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

Respectfully submitted,

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March 16, 2009